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ABSTRACT

Sixty subjects learned four different 16-word lists in four different conditions. Within each list, every word was repeated. The four conditions were defined by a 2 (whole vs. blocked presentation) by 2 (same order vs. random order repetition) factorial design. An unexpected final free recall followed the immediate free recall of the fourth list. It was found that significantly more reminiscence was observed in the whole-random condition, suggesting that initially imposed organization hindered the subsequent reorganization. (Author)

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Reminiscence: Evidence for Reorganization in Final Free Recall

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Reminiscence: Evidence for Reorganization in Final Free Recall

Studies in the organization theory of memory (Mandler, 1967; Tulving, 1968) have so far focused on the organization within a single list. There are two basic experimental paradigms. One can look at the free recall protocals of a single categorized list; or, one can examine the development of subjective organization in terms of the output consistency in a multiple-trial free recall learning of a single list with unrelated words. The relationship between the measurement of organization and recall has been well documented in the literature (Tulving & Donaldson, 1972). However, little attention has been paid to the problem of re-organization, even though its pedagogical implication is so obvious.

Ceraso (1967) asked his subjects to learn two different lists and observed that as time passed, subjects' recall of the two lists tended increasingly to merge with each other, a process that he call "crowding". Ceraso (1967) employed this concept of "crowding" to explain the phenomenon of proactive inhibition and suggested a general theory of memory search. Such a search theory is in line with the modern version of organization theory with its emphasis on retrieval processes. If learning of each single list requires the establishment of a retrieval plan, then "crowding" suggests a process of re-organization as a result of the interaction between the two lists. In this sense, the phenomenon of "crowding" demonstrates the dynamic nature of our memory system. This dynamic aspect of memory has rarely been studied within the realm of memory research.

Another essential aspect of an organization theory is the distinction between item availability and item retrievability (Tulving & Pearstone,

1966). That is, items may be available but not retrievable at the time of recall due to factors such as output interference, lack of appropriate retrieval cues, etc. If the process of "re-organization" is actually underlying the phenomenon of "crowding", then one would expect to observe "reminiscence" in a study-test-test paradigm. That is, with multiple list and with the employment of Craik's (1970) modified study-recall-recall paradigm, one should be able to observe that some items which are not recalled in the immediate recall are recovered in the final recall because of the change in the retrieval plan as a consequence of the interactions among these different lists. There was evidence showing that reminiscence did occur in a study-recall-recall experiment (Tulving, 1967).

The present study attemped to present further evidence in supporting the proposal that reminiscence could be regarded as a phenomenon resulting from reorganization of stored items. Studies by Tzeng and Hung (1973) and by Tzeng, Snyder, and Hung (1972) revealed that intralist-organization at the time of encoding could hinder reorganization in secondary memory. It was expected then, that reminiscence should be at minimum in the situation where items were blocked during presentation.

Method

Design and Materials

This study was a two (blocked vs. whole presentation) by two (same vs. random repetition order) factorial design which yielded four experimental conditions with the following formats:

Condition 1: Block-same

A B C D A B C D E F G H E F G H I J K L I J K L M N O P M N O P

Condition 2: Block-random

A B C D C A D B E F G H H F G E I J K L J I L K M N O P O P N M

Condition 3: Whole-Same

A B C D E F G H I J K L M N O P A B C D E F G H I J K L M N O P

Condition 4: Whole-Random

A B C D E F G H I J K L M N O P E O C K G A D N P B H F I M L J

The symbols A, B, C, --- P represented 16 unrelated words drawn randomly from the word pool of common words.

Procedure

Every subjects learned four different 16-word lists. Within each list, every word was repeated according to the format defined by the subject's assigned condition. The items were presented one-by-one through a Kodak carousel slide projector at a 3-second rate. At the end of each list presentation, subjects were asked to free recall the 16 words in that list. Thus, there were four immediate free recall (IFR) tests for each subject. Upon the completion of the fourth list, subjects were asked for an unexpected final free recall (FFR), that is, they were to recall as many words as possible from all the previous lists. Five minutes were allowed for this FFR.

Subjects

Sixty high school seniors from the Galion High School at Ohio served as subjects. They participated in this experiment as a requirement for experimental credits in their psychology course. They were assigned to the four experimental conditions alternatively according to the order of their appearances at the laboratory.

Results

The mean numbers of correct recall of both IFR and FFR for the four experimental conditions were summarized in Table 1. An inspection of

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Insert Table 1 about here

Table 1 revealed that in terms of the mean numbers of correct recall, both IFR and FFR reflected little difference resulting from the two experimental manipulations. Analysis of variance for a 2 x 2 factorial design yield not a single significant F for both main effects nor for their interaction effect in IFR as well as in FFR.

Of particular interest in this study is the comparison among the total number of reminiscence items in the four experimental conditions. Figure 1 shows the mean numbers of reminiscence items in the four conditions.

Insert Figure 1 about here

The analysis of variance showed that there was a significant main effect for presentation mode, with more reminiscence items being associated with the Whole presentation conditions, F (1,56) = 13.19, $p < .01$. The main effect of repetition order was also significant, with more reminiscence resulting from the Random repetition, F (1,56) = 5.93, $p < .05$. The interaction between these two experimental factors was not significant, F (1,56) = 2.034, $p > .05$.

Discussion

The results of the present study both corroborate and extend the findings of Tulving (1967). He argued for the distinction between item availability and item retrievability by demonstrating the phenomenon of reminiscence in a single list free recall study where three outputs followed each input. The present study strengthens this argument by showing reminiscence in a multiple-list delayed recall situation.

The point of interest lies in the finding that imposed organization

during the encoding phase reduces the possibility of later re-organization and that randomizing the repetition order boosts the probability of re-organization. Tzeng and his associates (Tzeng & Hung, 1973; Tzeng et al, 1972) have suggested that any restriction on subject's exposure to the whole list will have a detrimental effect on secondary memory. The results of the present experiment confirm this statement by showing that least reminiscence was observed in the Block-Same condition but highest reminiscence in the Whole-Random condition. It seems that the more restriction imposed at input, the harder it will be for the subject to re-organize the items at a later time. In this sense, randomization of items at the second input may function as a "disorganization" process which relaxes the initial organization and makes the subsequent re-organization more probable.

Traditionally, forgetting, as opposed to learning, has been conceptualized as loss of item information in memory. This, of course, implies a negative connotation. In an organization theory of memory which emphasizes the retrieval aspect of our memory system, forgetting is not conceived as the degradation of memory trace. It is the contention of the present author to suggest an alternative view of forgetting. Forgetting is not a phenomenon to be observed, instead, it is a process to be inferred from the initial organization of the to-be-learned material to its reorganization. Such a conceptualization assigns forgetting a positive value from a functional viewpoint. Since reorganization unconditionally presupposes a dismantling of the initial organization, the gaining of new information would not be possible without the breaking down of some previous knowledge which up to that moment, had appeared to be final. One may then say, whenever there is reorganization, there has been forgetting.

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Table 1

Mean Number of Correct Recalls

	Block		Whole	
	Same	Random	Same	Random
IFR	9.23	10.15	9.76	9.08
FFR	5.63	5.85	5.77	5.77

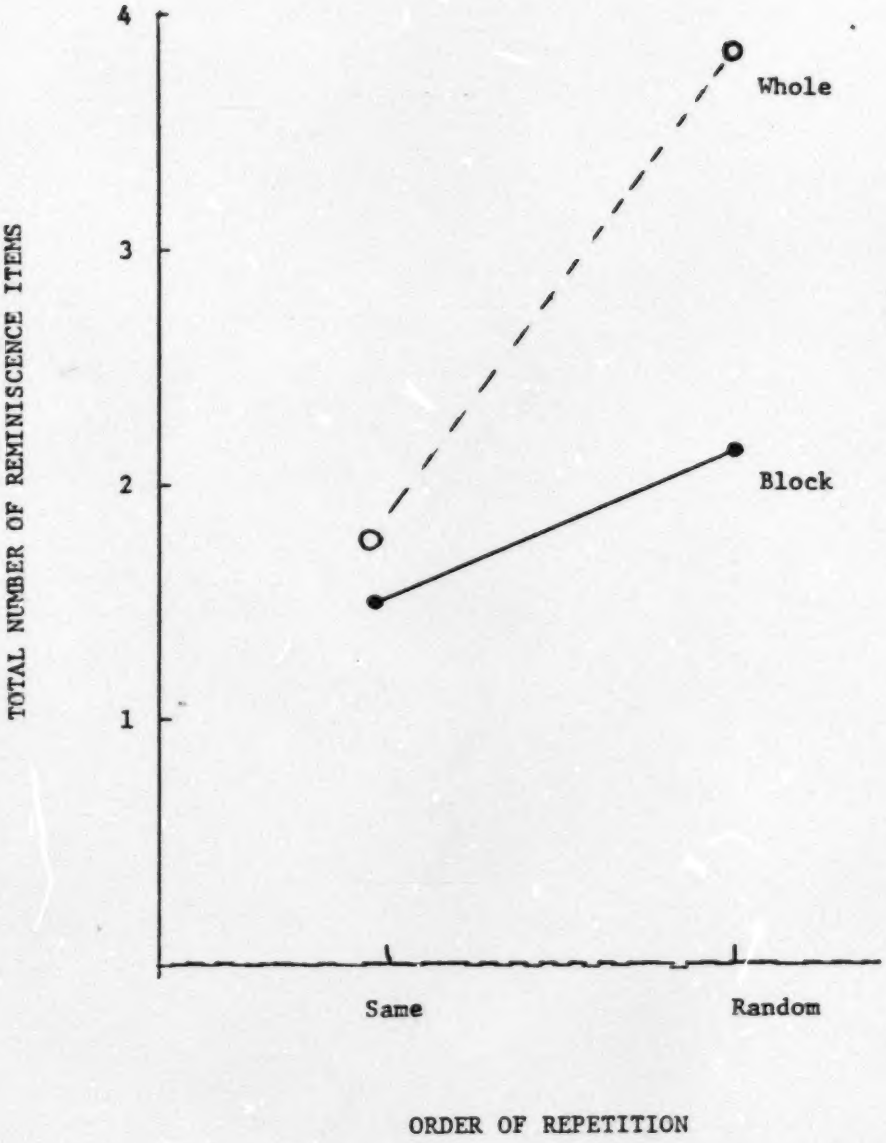

Figure 1. Total Number of Reminiscence Items as a Function of Presentation Mode and Repetition Order